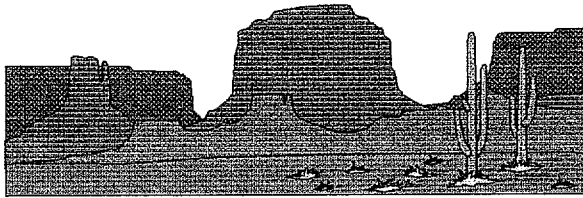


DEVELOPMENT ALTERNATIVES



DOUGLAS MUNICIPAL AIRPORT MASTER PLAN

CHAPTER VI: DEVELOPMENT ALTERNATIVES

6.0 INTRODUCTION

Chapter V, Facility Requirements, provides recommended development for the several items at Douglas Airport, and gives a basis for developing alternative expansion concepts. This Chapter will focus on development alternatives for the primary runway, which currently has a length which is less than the recommended length for the design aircraft type of B-II. Alternatives are also listed for specific terminal area and general aviation landside facility development.

The existing length of Runway 3/21 is 5,400 feet, while the recommended future length 5,760 feet. Two basic alternatives have been considered to meet the recommended runway length. These alternatives are:

- 1) Extend Runway 3/21 to the southwest by 360 feet.
- 2) Extend Runway 3/21 to the northeast by 360 feet.

The discussion of potentially moving the terminal and general aviation landside facilities to a different location is in response to recommendations given in a former Airport Master Plan Study and from wishes expressed by the Airport Sponsor. Three alternatives are shown for terminal/general aviation area development. The alternatives include:

- 3) Develop the terminal area at its existing location.
- 4) Develop the terminal area at a new location (near the T-hangars).
- 5) Develop recommended hangars at the new location, and develop the remaining landside facilities at the existing terminal area.

The following narrative analyzes the details of the alternatives listed above and the advantages and disadvantages associated with each. Preliminary

6.1 RUNWAY 3/21 ALTERNATIVES AND ESTIMATES OF COST

ALTERNATIVE 1

Extend Runway 3/21 to the southwest by 360 feet.

Alternative 1 evaluates the consequences of extending Runway 3/21 to the southwest to a total usable length of 5,760 feet. This alternative would also involve extending the parallel taxiway to meet the future runway end.

The major advantages of this alternative are:

1. Alternative 1 will provide a runway which meets the recommended runway length requirements for the existing and future design aircraft groups at Douglas Municipal Airport.
2. The runway extension would occur away from an existing cultural site (Geronimo Trail), which is located immediately to the north of airport property.

The major disadvantages of this alternative are:

1. Approximately 10 acres of land would need to be acquired to the west of existing airport property to encompass the Runway Object Free Area (OFA) and ultimate Runway Protection Zone (RPZ).
2. Extension of the runway in this direction would occur toward Mexico, and increase the amount of approach and/or departure area into foreign airspace.
3. A city street located on the west boundary of airport property will have to be relocated at the point of its intersection with the Runway Protection Zone.

ALTERNATIVE 2

Extend Runway 3/21 to the northeast by 360 feet.

This alternative would involve the extension of Runway 3/21 to a total usable length of 5,760 feet. The parallel taxiway would also be extended to a full length parallel taxiway.

The major advantages of this alternative are:

1. Alternative 2 will provide a runway which meets the recommended runway length requirements for the existing and future design aircraft groups at Douglas Municipal Airport.
2. Extension of the runway and its parallel taxiway to the northeast will occur away from Mexico, therefore not increasing the approach or departure area into foreign airspace, as in Alternative 1.

The major disadvantages of this alternative are:

1. The runway/taxiway extension would occur toward an existing cultural site (Geronimo Trail), located immediately to the north of airport property, resulting in the relocation of this trail.
2. A runway extension in this direction will require relocation of an existing city street which runs along the northern airport property boundary.
3. Approximately 3 acres of land would have to be acquired to the north of existing airport property.
4. A border patrol tower off the northeast end of Runway 3/21 will penetrate the runway's Transitional Surface after it is extended, and will therefore have to be relocated or marked and lighted.
5. Extensions to the taxiway would have to occur on both ends to produce a full length parallel taxiway with Alternative 2, whereas Alternative 1 would only require extending the taxiway on one end.

It should be noted that although an estimate of cost has been developed for Alternative 2, the actual cost of relocating the Geronimo Trail will depend on the political atmosphere and administrative efforts of the involved parties. It is recommended that these factors be weighed heavily against the advantages of Alternative 1.

The following tables outline the comparative costs for construction of each Runway 3/21 alternative concept. The preferred alternative will be included in Chapter VIII, Financial Plan and Capital Improvement Program, with the year of construction shown for each phase.

**TABLE VI-1
ALTERNATIVE 1 COST ESTIMATES**

Description	Total Cost	State Share	Sponsor Share
Acquire approximately 10 acres of land	\$10,000	\$9,000	\$1,000
Relocate city street and install perimeter fencing around Runway Object Free Area	\$162,000	\$145,800	\$16,200
Extend Runway 3/21 by 360 feet	\$200,000	\$180,000	\$20,000
TOTAL COSTS	\$372,000	\$334,800	\$37,200

**TABLE VI-2
ALTERNATIVE 2 COST ESTIMATES**

Description	Total Cost	State Share	Sponsor Share
Acquire approximately 3 acres of land	\$3,000	\$2,700	\$300
Relocate city street	\$444,000	\$399,600	\$44,400
Relocate Geronimo Trail	Unknown	Unknown	Unknown
Relocate airport perimeter fence	\$5,700	\$5,130	\$570
Extend Runway 3/21 by 360 feet	\$200,000	\$180,000	\$20,000
TOTAL COSTS	\$652,700*	\$587,430*	\$65,270*

** Not including cost of relocating Geronimo Trail.*

All costs shown in Tables VI-1 and VI-2 are shown in 1994 dollars.

6.2 TERMINAL AREA ALTERNATIVES AND ESTIMATES OF COST

ALTERNATIVE 3

Develop the terminal area at its existing location.

This alternative examines the advantages and disadvantages of developing the terminal area at its present location. In other words, all recommended landside development such as the apron expansion, tiedowns, and hangar locations will be constructed within the immediate area of the existing general aviation area. Figure 6-1 is a sketch of this development.

Major advantages of this alternative are:

1. Maintaining general aviation facilities at their present location and developing new facilities at the existing site will cost less than developing an entirely new site.

Major disadvantages of this alternative are:

1. Residential area to the west of the terminal area is somewhat affected by aircraft noise and other activity. Therefore, a sound barrier wall should be constructed on the west airport property line along the terminal area for noise reduction.
2. An access strip will have to be provided to the location of the new conventional hangars, which will require the relocation of two storage buildings.

ALTERNATIVE 4

Develop the terminal area at a new location (near the T-hangars).

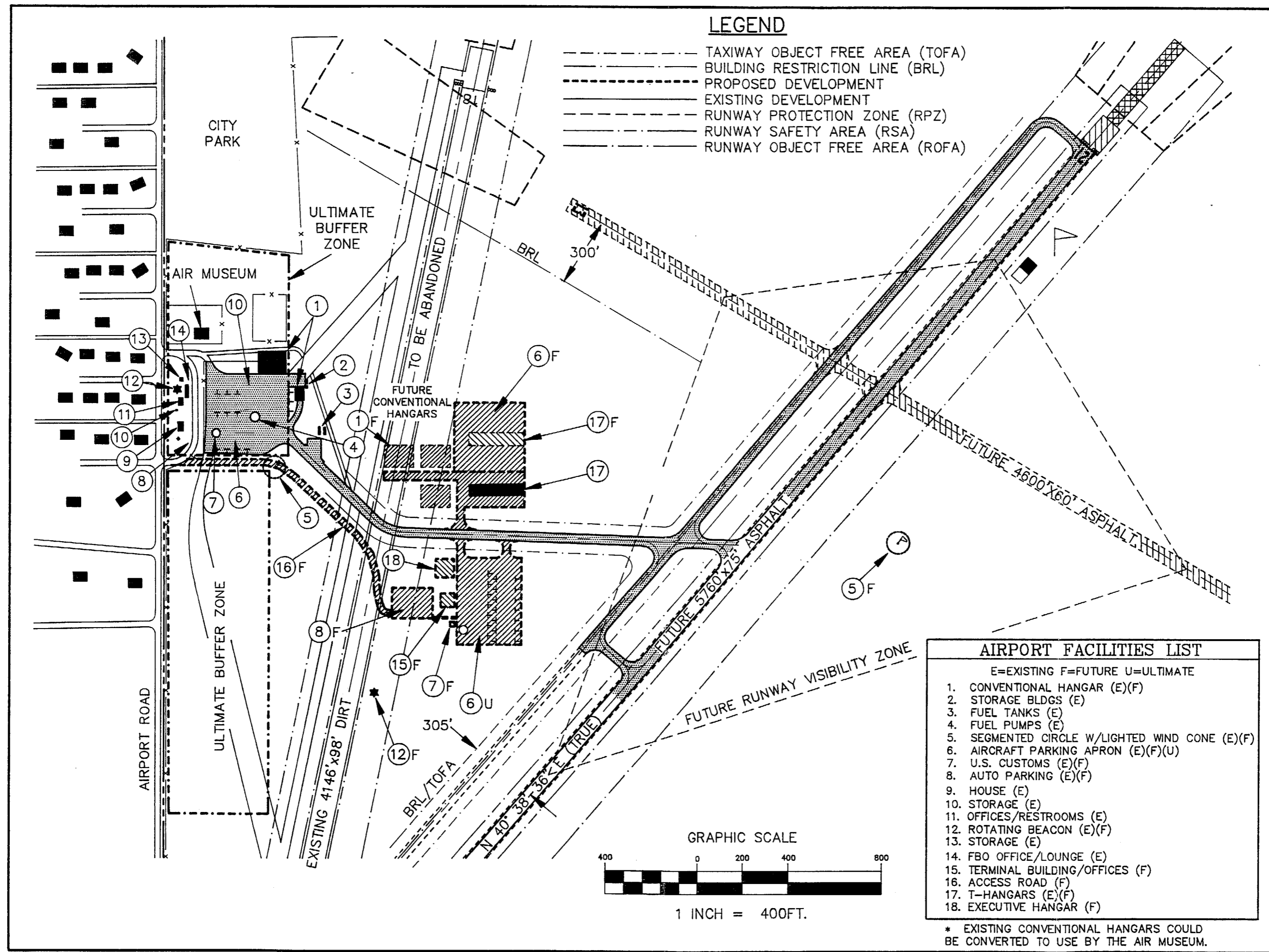
This alternative was examined to determine the advantages and disadvantages of moving the terminal area development closer to the runway system. Figure 6-2 provides a sketch of how this development would appear. It would involve constructing a new aircraft parking apron, terminal building, U.S. Customs area, tiedowns and hangar space to the new area.

Major advantages of this alternative are:

1. Developing a new terminal area closer to the runway system will decrease taxi time for arriving or departing aircraft.
2. Developing a new terminal area at the site shown in Figure 6-2 will move aircraft activity and associated noise away from existing residential development which is located to the west of airport property.

Major disadvantages of this alternative are:

1. Existing development (apron, tiedowns, office space, hangars, etc.) will have to be relocated, converted to a new use, or abandoned.



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DOUGLAS, ARIZONA

DEVELOPMENT ALTERNATIVES

Revisions:

Project No: 935451
Date:
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Drawn: JLW
Checked: SLH
Approved: KEK

**ALTERNATIVE 4
TERMINAL AREA
DEVELOPMENT**

FIGURE 6-2

-
2. A new terminal area location will require the extension of utilities to that area.
 3. New facilities will have to be built at the new site to replace those which are abandoned at the existing site.

ALTERNATIVE 5

Develop recommended hangar space at new location, and develop remaining landside facilities at existing terminal area

Alternative 5 represents a compromise of Alternatives 3 and 4. This alternative would result in the development of both areas mentioned previously - the existing general aviation ramp and fuel area and the T-hangar area. Figure 6-3 is a sketch of how the recommended facilities could be divided between both locations.

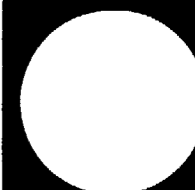
Major advantages of this alternative are:

1. Existing development can be utilized, while new development can take place to allow more space for landside facilities.
2. Developing the terminal area as shown in Figure 6-3 will allow for unconstrained development in the future.

Major disadvantages of this alternative are:

1. Alternative 5 would result in a separation between general aviation facilities, which will require an extension of the airport access road.
2. Residential area to the west of the terminal area is somewhat affected by aircraft noise and other activity. Therefore, a sound barrier wall should be constructed on the west airport property line along the terminal area for noise reduction.

The following tables outline the comparative costs for construction of each terminal area alternative concept. The preferred alternative will be included in Chapter VIII, Financial Plan and Capital Improvement Program, with the year of construction shown for each phase.



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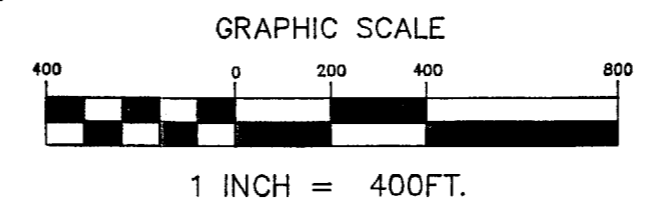
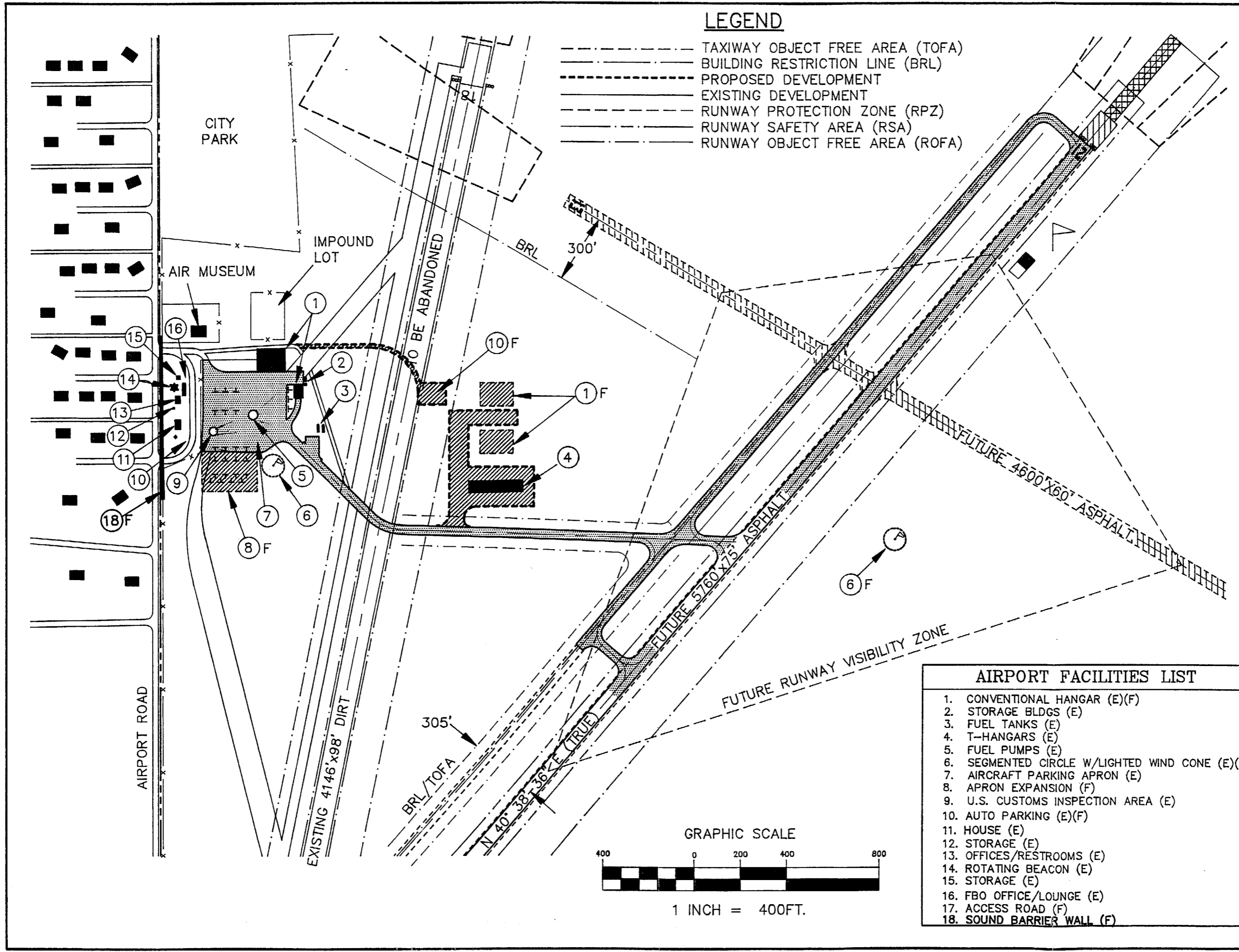
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ALTERNATIVE 5
TERMINAL AREA
DEVELOPMENT

FIGURE 6-3

LEGEND

- TAXIWAY OBJECT FREE AREA (TOFA)
- BUILDING RESTRICTION LINE (BRL)
- PROPOSED DEVELOPMENT
- EXISTING DEVELOPMENT
- RUNWAY PROTECTION ZONE (RPZ)
- RUNWAY SAFETY AREA (RSA)
- RUNWAY OBJECT FREE AREA (ROFA)



AIRPORT FACILITIES LIST

1. CONVENTIONAL HANGAR (E)(F)
2. STORAGE BLDGS (E)
3. FUEL TANKS (E)
4. T-HANGARS (E)
5. FUEL PUMPS (E)
6. SEGMENTED CIRCLE W/LIGHTED WIND CONE (E)(F)
7. AIRCRAFT PARKING APRON (E)
8. APRON EXPANSION (F)
9. U.S. CUSTOMS INSPECTION AREA (E)
10. AUTO PARKING (E)(F)
11. HOUSE (E)
12. STORAGE (E)
13. OFFICES/RESTROOMS (E)
14. ROTATING BEACON (E)
15. STORAGE (E)
16. FBO OFFICE/LOUNGE (E)
17. ACCESS ROAD (F)
18. SOUND BARRIER WALL (F)

**TABLE VI-3
ALTERNATIVE 3 COST ESTIMATES**

Description	Total Cost	State Share	Sponsor Share
Construct apron expansion - Remove and replace segmented circle and lighted wind cone	\$220,000	\$198,000	\$22,000
Construct access for conventional hangars - Relocate storage buildings	\$85,000	\$76,500	\$8,500
Construct two conventional hangars	\$384,000	\$345,600	\$38,400
Construct sound barrier wall (1,000 feet long and 8 feet high)	\$118,000	\$106,200	\$11,800
TOTAL COSTS	\$807,000	\$726,300	\$80,700

**TABLE VI-4
ALTERNATIVE 4 COST ESTIMATES**

Description	Total Cost	State Share	Sponsor Share
Construct new aircraft parking apron (Phase I)	\$278,000	\$250,200	\$27,800
Construct aircraft parking apron (Phase II)	\$300,000	\$270,000	\$30,000
Extend utilities to new terminal area	\$100,000	\$90,000	\$10,000
Construct terminal, executive hangar, and new U.S. Customs building	\$570,000	\$500,000	\$70,000
Extend airport access road and construct auto parking facility	\$165,000	\$148,500	\$16,500
Construct access for conventional hangars and construct three conventional hangars	\$626,000	\$500,000	\$126,000
Relocate rotating beacon	\$50,000	\$45,000	\$5,000
Install new segmented circle with lighted wind cone	\$18,000	\$16,200	\$1,800
TOTAL COSTS	\$2,107,000	\$1,819,900	\$287,100

**TABLE VI-5
ALTERNATIVE 5 COST ESTIMATES**

Description	Total Cost	State Share	Sponsor Share
Construct apron expansion - Remove segmented circle and lighted wind cone and install new one	\$220,000	\$198,000	\$22,000
Extend utilities to hangar area	\$100,000	\$90,000	\$10,000
Construct access for conventional hangars	\$80,000	\$72,000	\$8,000
Construct two conventional hangars	\$384,000	-----	\$384,000
Extend airport access road and construct auto parking facility	\$64,000	\$57,600	\$6,400
Construct sound barrier wall (700 feet long and 8 feet high)	\$118,000	\$106,200	\$11,800
TOTAL COSTS	\$966,000	\$523,800	\$442,200

All costs shown in Tables VI-3, VI-4, and VI-5 are shown in 1994 dollars.

6.3 SUMMARY

Any decision on future development of the Douglas Municipal Airport should be made on a sound basis. This should include evaluating all factors involved with each alternative and quantifying to the extent possible, these factors in determining what is the best development plan. Consequently, it is difficult to assess factors such as impact to cultural resources compared to cost of construction.

It is suggested that Alternative 1 be considered as the "preferred" primary runway development at Douglas Municipal Airport. Environmental considerations including historical and cultural resources should be carefully weighed before proceeding with any construction project. By extending Runway 3/21 and its parallel taxiway to the southwest, expansion will occur away from the Geronimo Trail, an existing cultural site. It would appear that Alternative 5 should be considered the preferred development for the recommended landside facilities, considering cost and related factors. Cost estimates show that developing an entirely new general aviation area is less cost effective than utilizing existing development. Measures can be taken to ensure compatible land uses with

existing residential development to the west of the terminal area, such as the construction of a sound barrier wall with an aesthetically pleasing facing to reduce potential noise impacts.

At a meeting on August 8, 1994, the Airport Authority chose Alternative 4 as the preferred terminal area development. Therefore, the estimates of costs for Alternative 4 will be shown in the Capital Improvement Program in Chapter IX of this study.